C-PRO GIGA

PROGRAMMABLE CONTROLLERS



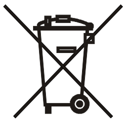
HARDWARE MANUAL

114CPRGHWE01

Important

Please read these instructions carefully before installation and use, and follow all the cautions for installation and electrical connections; keep these instructions with the device for future consultation.

The device must be disposed of in accordance with local regulations pertaining to the collection of electrical and electronic appliances.



Summary

1 Introduction

The **C-PRO GIGA** programmable controllers family is the right solution for refrigeration, ventilation and air conditioning applications. Both in terms of controls and-or regulation and the user interface, the controller application software is fully programmable, in a simple and intuitive way, thanks to the use of the **UNI-PRO** development environment.

The C-PRO Giga is available in a DIN rail version (see the figure below).

By using the 13 relay outputs, it is possible to control various types of devices such as compressors, water circulation pumps, defrosting elements, condensation or evaporation fans, cycle inversion valves, alarm warning indicators etc.
The C-PRO Giga is also equipped with 4 analogic outputs 0,5-10 V or 4-20 mA.

The controller has 8 analogic inputs:

- 2 for PTC and-or NTC probes / 0-5 V transducers / 0-10 V transducers/ 0-20 mA transducers / 4-20 mA transducers
- 6 for NTC probes / 0-20 mA transducers / 40-20 mA transducers

C-PRO GIGA is also equipped with 12 digital inputs:

- 10 for low voltage (12-24 Vac/dc)
- 2 for high voltage (230 VAC), both for normally open contact.

All the parameters may be adjusted from the user interface.

The display is 4 x 20 font alphanumeric LCD; the keypad has 9 keys and 6 signals LED ; the sealed case versions have neither display nor keypad and must be used in conjunction with a remote terminal.

The controllers have the following serial communication ports

- n° 1 optoinsulated RS-485 (always mounted on the controller)
- n° 1 no optoinsulated LocalCAN (always mounted on the controller)
- n° 1 optoinsulated RS-485 or n° 1 RS-232, (on request, not available on built-in version)
- n° 1 optoinsulated WideCAN, (on request ,available only on 128 KB memory version).

C-PRO GIGA has real time clock.

With C-PRO EXP KILO, C-PRO EXP MEGA e C-PRO EXP GIGA, I/O improvement is possible.

The following table shows the C-PRO GIGA main characteristics:

	Dimensions	Power supply	Analogic Inputs	Digital Inputs	Analogic outputs	Digital output	CAN ports	UART ports
C-PRO GIGA	14 DIN modules	12 VDC (main supply) + 12 VDC (secondary supply) or 24 VAC/DC	8	12	4	13	local CAN (standard) + wide CAN (optional)	RS-485 (standard) + RS-485 or RS-232 (both optional)

Attention :

With 12 Vdc + 12 Vdc power supply, the following ports and outputs are optoinsulated :

- the analogic output
- the RS-485 serial standard port
- the RS-485 serial (or RS-232) optional port
- the wide CAN port

In order to ensure the optoinsulation of these outputs the controller must be supplied with two dc power sources preferably insulated from each other (electrically insulated).

With 24 VAC/DC power supply , the following ports and outputs are not optoinsulated:

- the analogic outputs
- the RS-485 standard port
- the RS-485 (or RS-232) optional port
- the Wide CAN port

Optional RS-485 (or RS-232) port is not available on the built-in versions.
Optional wide CAN is available only on 128 KB memory version.



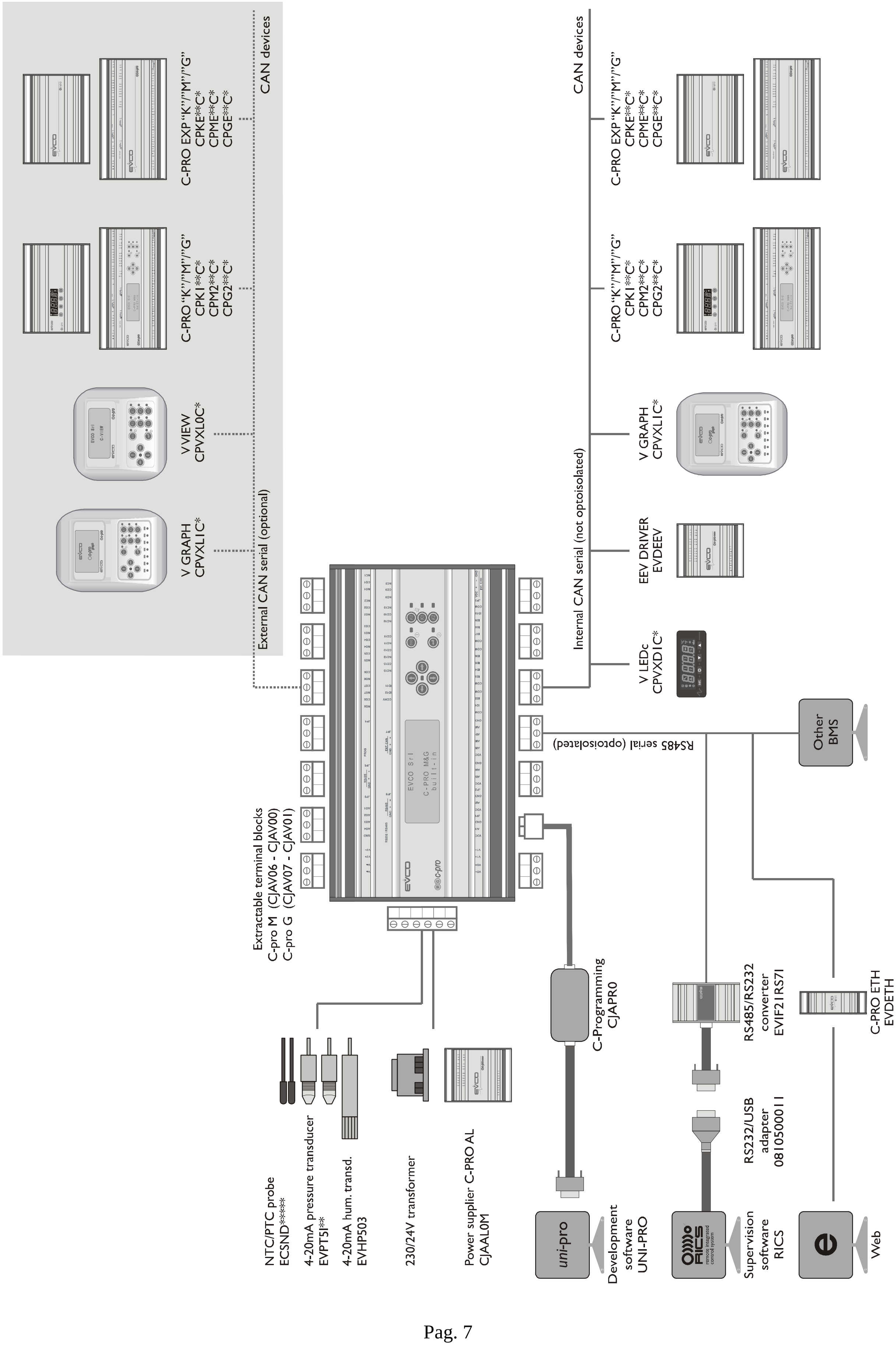
C-PRO GIGA
Built-in version



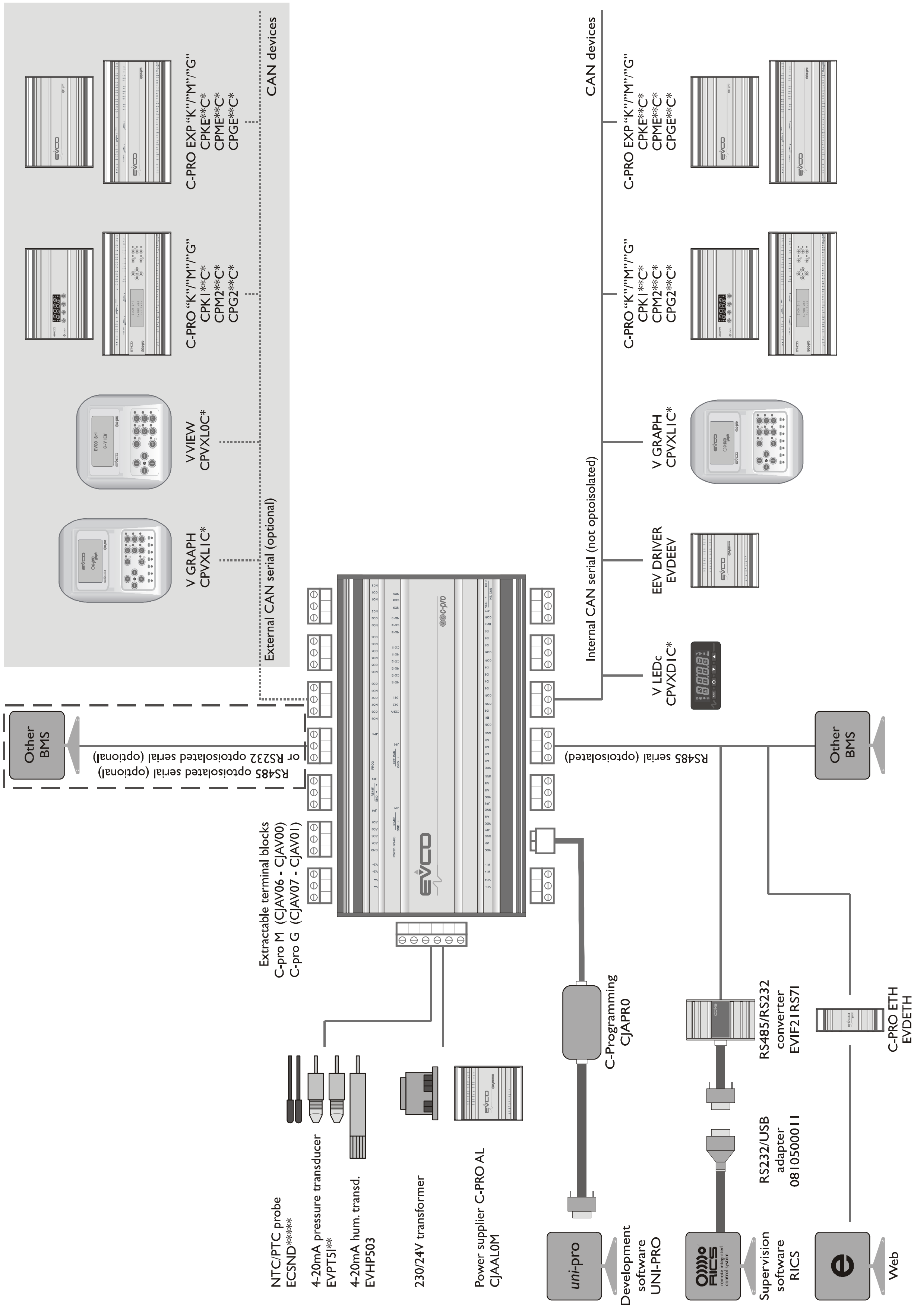
C-PRO GIGA
Sealed case version

1 Components and Accessories network

1.1 Built-in version example



1.2 Sealed case version example



2 Technical features

2.1 Connections

Power supply:
The C-PRO Giga family is available with two different versions of power supply :

i. No optoinsulated internal switching 24Vac/dc version
ii. two separated inputs 12 Vdc + 12 Vdc version. With this version the following ports and outputs are optoinsulated :

- the analogic output
- the RS-485 serial standard port
- the RS-485 (or RS-232) optional serial port
- the Wide CAN port

In order to ensure the optoinsulation of these outputs the controller must be supplied with two dc power sources preferably electrically insulated, one from the other, for example by using an EVCO power supplier “c-pro AL”.
The connection cables length must be 1 m, at the most.

Analogic input connections:
The C-PRO GIGA has two analogic inputs (universal named) suitable for the NTC, PTC, Voltage (0-10V, 0-5V), Current (0-20mA, 4-20mA) sensors. The choice is automatically made by means of the UNI-PRO development system or parameters. A Jumper must be removed only for the 0-10V energized input (refer to the physical layout section and jumpers).
The C-PRO GIGA has six analogic inputs (configurable named) suitable for the NTC and Current sensors (0-20mA, 4-20mA). The choice is automatically made by means of the UNI-PRO development system or parameters. Note that the six inputs are divided into three pairs; each pair must have the same input type.
The active probes may be fed by using the VDC terminals (see physical layout) with a stabilized voltage of 12.5V (total maximum current <=200mA). The length of the analogic input connections cables must be 3 m, at the most.

Digital input connections :
The C-PRO GIGA has ten low-voltage optoinsulated digital inputs (12-24Vac/dc) and two additional high-voltage optoinsulated inputs (110-240Vac). To benefit from the optoinsulation features, it's recommended to separate the digital input feed from the main power supply of the controller. If the C-PRO GIGA is fed by using the C-PRO AL switching power supply, that can be used to feed the controller and the digital inputs.
The length of the digital input connections cables must be 3 m, at the most.

Digital output connections :
C-PRO GIGA has 13 digital outputs. There are no groupings of terminals, therefore each individual contact can be used for the declared specifications.
The length of the digital output connections cables must be 3 m, at the most.

Analogic output connections :
C-PRO GIGA has 4 optoinsulated analogic outputs (voltage or current). Both voltage and current selection are achieved by using Jumpers (see section wiring layout) and parameters.
The length of the analogic output connections cables must be 3 m, at the most.

User interface connection :
The connection between C-PRO GIGA and the remote user interface has to be done with 4 wire cable (better with two weaved couples).

The maximum length of the connection cables to the user interface depends on the CAN port baud-rate .
Local CAN port:

- 10 m with 20.000 baud
- 5 m with 50.000 baud
- 2 m with 125.000 baud
- 1 m with 500.000 baud.

Wide CAN port:

- 1.000 m with 20.000 baud
- 500 m with 50.000 baud
- 250 m with 125.000 baud
- 50 m with 500.000 baud.

The LocalCAN port baud rate is settable by jumpers (see section wiring layout).
The WideCAN port baud rate is settable by parameter.

Connection with a remote expansion (or another CAN controller) :
The connection between C-PRO GIGA and the remote expansion (or another CAN controller) has to be done with 4 wire cable (better with two weaved couples).
The maximum length of the connection cables to the remote controllers or expansions depends on the CAN port baud rate (see above section "User interface connections")
C-PRO GIGA and the expansion (or other CAN controller) power supply have to be electrically insulated one from the other.

Electrical wiring cautions

- do not work with electric or pneumatic screw-wrenches on the connectors of the controller
- if the device has been moved from a cold to a warm environment, humidity condensation may have formed inside; please, wait approximately one hour before to switching it on.
- ensure that the voltage, frequency and operational power of the device are compatible with the local power supply
- disconnect the power supply before proceeding with any kind of operation of maintenance
- do not use the device as a safety device
- for repairs and any information relating to the device, contact the Evco dealer network.

Cautions
Besides the maximum length of the connection cables, some other cautions have to be respected :

To avoid immunity problems, it is good practice to observe the following instructions:

- Avoid locations with antennas
- Do not wire probe inputs together with relay outputs; generally avoid combining low and high voltage
- Avoid winding the wirings onto power components

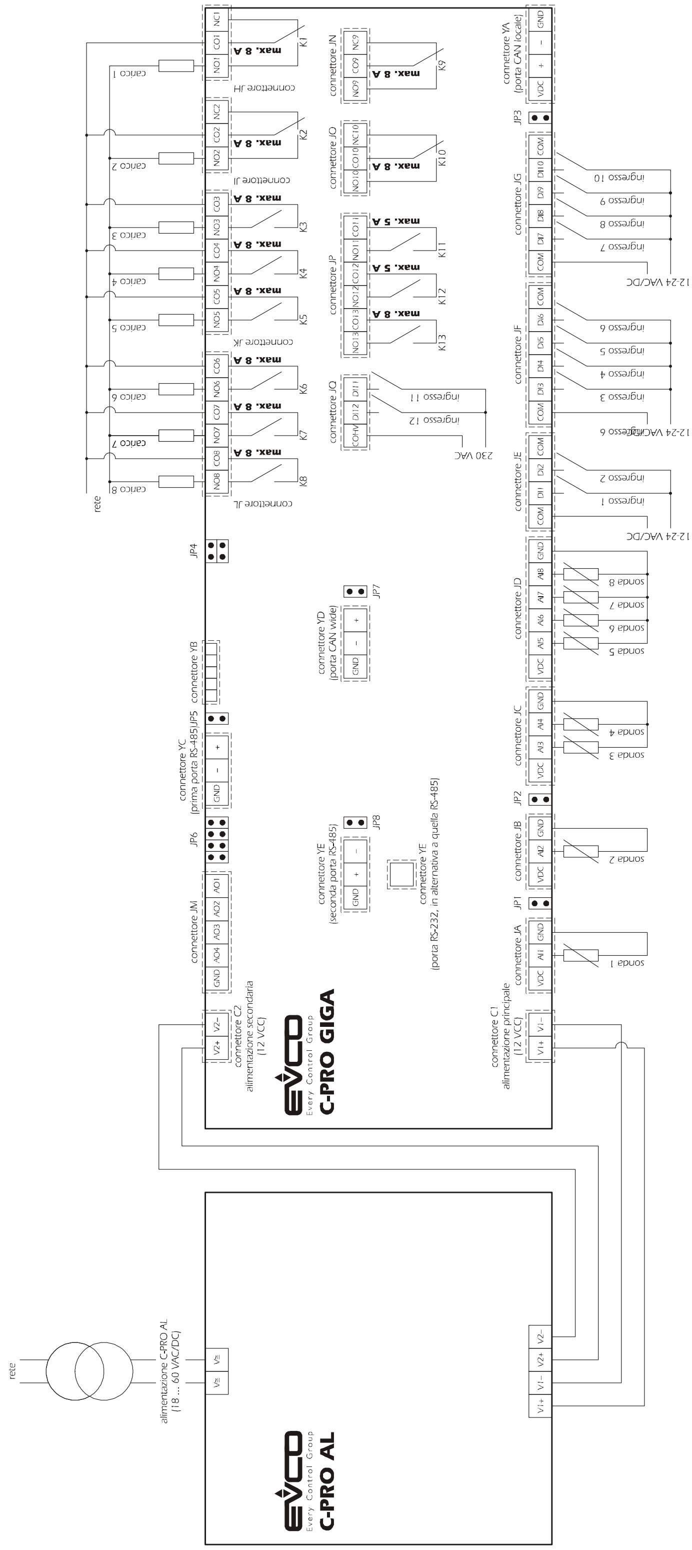
To avoid safety problems, it is good practice to observe the following instructions:

- Avoid rooms with relative humidity >90%
- Avoid water
- Avoid corrosive environments
- Avoid explosive environments

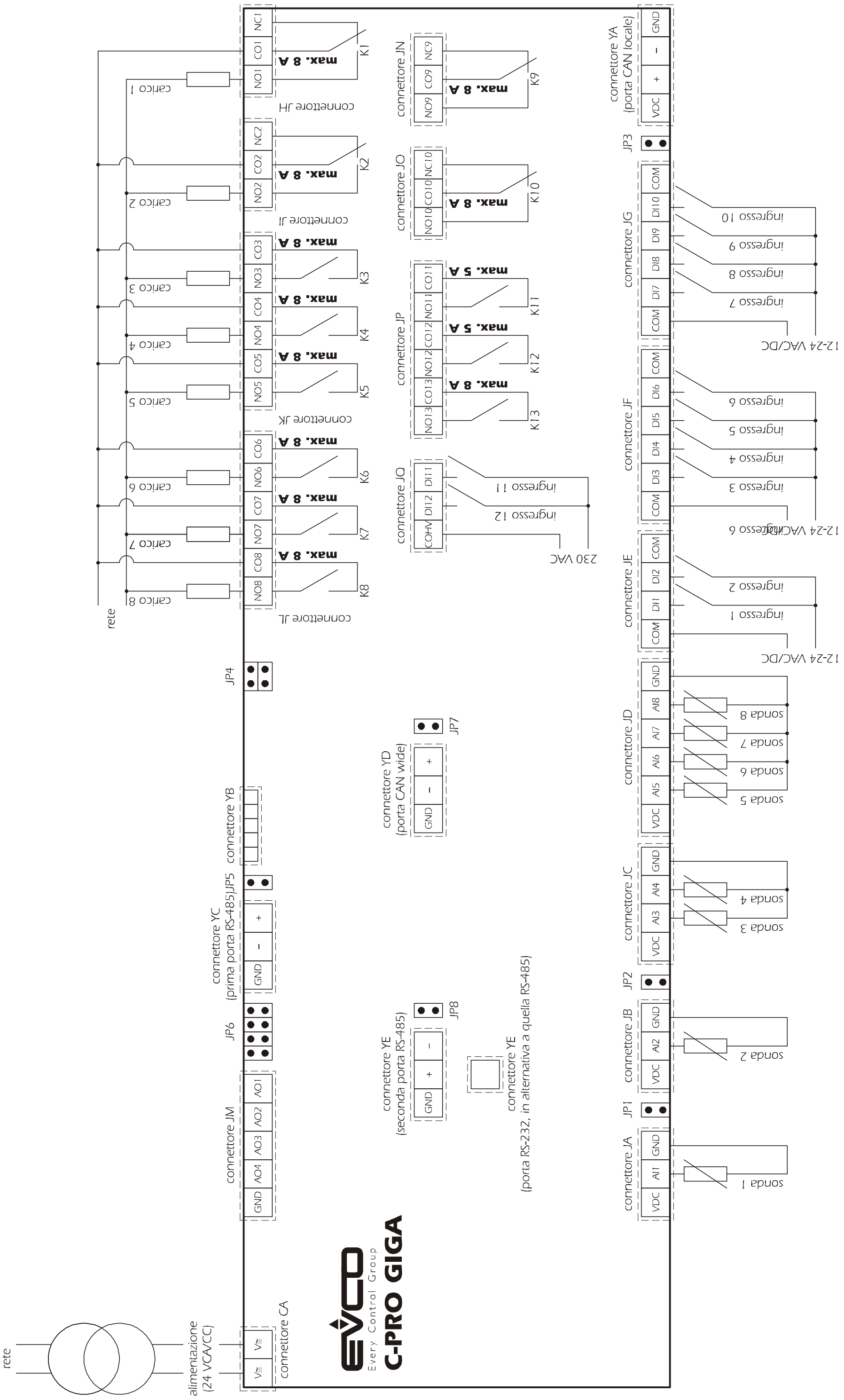
Besides, ensure that the operating conditions correspond with the use limits indicated in the technical features.

2.2 C-PRO GIGA wiring layout

C-PRO GIGA is available in two different versions : the first with 12 VDC + 12 VDC and the second with 24 VAC/DC power supply.
The C-PRO GIGA 12 VDC + 12 VDC wiring layout connection is reported here below;
C-PRO AL power supplier adoption is recommended
Please, refer to the section "power supply" of chapter 3 regarding the utilization optoinsulation.



The C-PRO GIGA 24 VAC/DC version wiring layout connection is reported here below;
C-PRO AL power supplier adoption is recommended
<u>Please, refer to the section “power supply” of chapter 3 regarding the utilization optoinsulation.</u>



The following table shows the available inputs and outputs on C-PRO Giga :

Lower board 12 VDC + 12 VDC power supply version

Conn.	Letter code	Description
C1-1	VCC	main card power supply (+13Vdc)
C1-2	GND	Main power supply reference
JA-1	VDC	power supply for active sensors (*1)
JA-2	AI 1	universal analogic input 1 (NTC, PTC, 0..5V, 0..10V, 0..20 mA, 4..20 mA)
JA-3	GND	common terminal for analogic inputs
JB-1	VDC	power supply for active sensors (*1)
JB-2	AI 2	universal analogic input 2 (NTC, PTC, 0..5V, 0..10V, 0..20 mA, 4..20 mA)
JB-3	GND	common terminal for analogic inputs
JC-1	VDC	power supply for active sensors (*1)
JC-2	AI 3	analogic input 3, configurable (NTC, 0..20 mA, 4..20 mA)
JC-3	AI 4	analogic input 4, configurable (NTC, 0..20 mA, 4..20 mA)
JC-4	GND	common terminal for analogic inputs
JD-1	VDC	power supply for active sensors (*1)
JD-2	AI 5	analogic input 5, configurable (NTC, 0..20 mA, 4..20 mA)
JD-3	AI 6	analogic input 6, configurable (NTC, 0..20 mA, 4..20 mA)
JD-4	AI 7	analogic input 7, configurable (NTC, 0..20 mA, 4..20 mA)
JD-5	AI 8	analogic input 8, configurable (NTC, 0..20 mA, 4..20 mA)
JD-6	GND	common terminal for analogic inputs
JE-1	COM	common terminal for digital inputs
JE-2	DI 1	digital input no. 1 Vac/Vdc
JE-3	DI 2	digital input no. 2 Vac/Vdc
JE-4	COM	common terminal for digital inputs
JF-1	COM	common terminal for digital inputs
JF-2	DI 3	digital input no. 3 Vac/Vdc
JF-3	DI 4	digital input no. 4 Vac/Vdc
JF-4	DI 5	digital input no. 5 Vac/Vdc
JF-5	DI 6	digital input no. 6 Vac/Vdc
JF-6	COM	common terminal for digital inputs
JG-1	COM	common terminal for digital inputs
JG-2	DI 7	digital input no. 7 Vac/Vdc
JG-3	DI 8	digital input no. 8 Vac/Vdc
JG-4	DI 9	digital input no. 9 Vac/Vdc
JG-5	DI 10	digital input no. 10 Vac/Vdc
JG-6	COM	common terminal for digital inputs
YA-1	VDC	12 Vdc power supply output to remote user interface
YA-2	CAN1+	CAN+ output to Local CAN
YA-3	CAN1-	CAN- output to Local CAN
YA-4	GND	GND power supply output to remote user interface
JH-1	NC 1	normally closed contact relay no. 1
JH-2	COM 1	common relay no. 1
JH-3	NO 1	normally open contact relay no. 1
JI-1	NC 2	normally closed contact relay no. 2
JI-2	COM 2	common relay no. 2
JI-3	NO 2	normally open contact relay no. 2
JK-1	COM 3	common relay no. 3
JK-2	NO 3	normally open contact relay no. 3
JK-3	COM 4	common relay no. 4

Conn.	Letter code	Description
JK-4	NO 4	normally open contact relay no. 4
JK-5	COM 5	common relay no. 5
JK-6	NO 5	normally open contact relay no. 5
JL-1	COM 6	common relay no. 6
JL-2	NO 6	normally open contact relay no. 6
JL-3	COM 7	common relay no. 7
JL-4	NO 7	normally open contact relay no. 7
JL-5	COM 8	common relay no. 8
JL-6	NO 8	normally open contact relay no. 8
YB	PRG	JST connector for programming purposes
YC-1	RS485+	RS 485 + serial port connector
YC-2	RS485-	RS 485 - serial port connector
YC-3	GND*	GND serial port connector
JM-1	AO 1	analogic output no. 1 (0,5..10 V / 4..20mA)
JM-2	AO 2	analogic output no. 2 (0,5..10 V / 4..20mA)
JM-3	AO 3	analogic output no. 3 (0,5..10 V / 4..20mA)
JM-4	AO 4	analogic output no. 4 (0,5..10 V / 4..20mA)
JM-5	GND*	Common terminal for analogic outputs
C2-1	VCC*	secondary power supply for optoinsulated serial ports and analogic outputs (15Vdc)
C2-2	GND*	Secondary power supply reference

*1**:** VDC=12,5V Imax=200mA (total for all VDC terminal)

Lower board 24 VAC/DC power supply version with built-in switching feeder

Conn.	Letter code	Description
CA-1	VCC	main card power supply (24Vac/dc)
CA-2	VCC	main card power supply (24Vac/dc)

Top board

Conn.	Letter code	Description
JN-1	NC 9	normally closed contact relay no. 9
JN-2	COM 9	common relay no. 9
JN-3	NO 9	normally open contact relay no. 9
JO-1	NC 10	normally closed contact relay no. 10
JO-2	COM 10	common relay no. 10
JO-3	NO 10	normally open contact relay no. 10
JP-1	COM 11	common relay no. 11
JP-2	NO 11	normally open contact relay no. 11
JP-3	COM 12	common relay no. 12
JP-4	NO 12	normally open contact relay no. 12
JP-5	COM 13	common relay no. 13
JP-6	NO 13	normally open contact relay no. 13
JQ-1	DI 11	digital input no. 11 230 Vac
JQ-2	DI 12	digital input no. 12 230 Vac
JQ-3	COMHV	common terminal for 230Vac digital inputs

Wide CAN port (on request)

Conn.	Letter code	Description
YD-1	CAN0+	CAN + terminal Wide CAN port
YD-2	CAN0-	CAN - terminal Wide CAN port
YD-3	GND*	GND terminal Wide CAN port

Second RS-485 port(on request)

Conn.	Letter code	Description
YE-1	RS485-	RS 485 - serial serial port terminal
YE-2	RS485+	RS 485 + serial port terminal
YE-3	GND*	GND serial port terminal

RS-232 port (on request, alternative to second RS-485 port)

Conn.	Letter code	Description
YF-1	5Vdc	RS 232 9-pin connector -
YF-2	Tx	RS 232 9-pin connector – Transmitting data
YF-3	Rx	RS 232 9-pin connector – Receiving data
YF-4	DTR/DSR	RS 232 9-pin connector -
YF-5	GND	RS 232 9-pin connector -
YF-6	DTR/DSR	RS 232 9-pin connector -
YF-7	RTS	RS 232 9-pin connector -
YF-8	CTS	RS 232 9-pin connector -

Jumpers and LED meaning

The controller also has some configuration jumpers:

JMP1	Selection of analogic AI1 input	
	Jumper not inserted	0-10V input
	Jumper inserted	0-5V, 0-20mA, 4-20mA, NTC, PTC input

JMP2	Selection of analogic AI2 input	
	Jumper not inserted	0..10V input
	Jumper inserted	0-5V, 0-20mA, 4-20mA, NTC, PTC input

JMP3	CAN termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

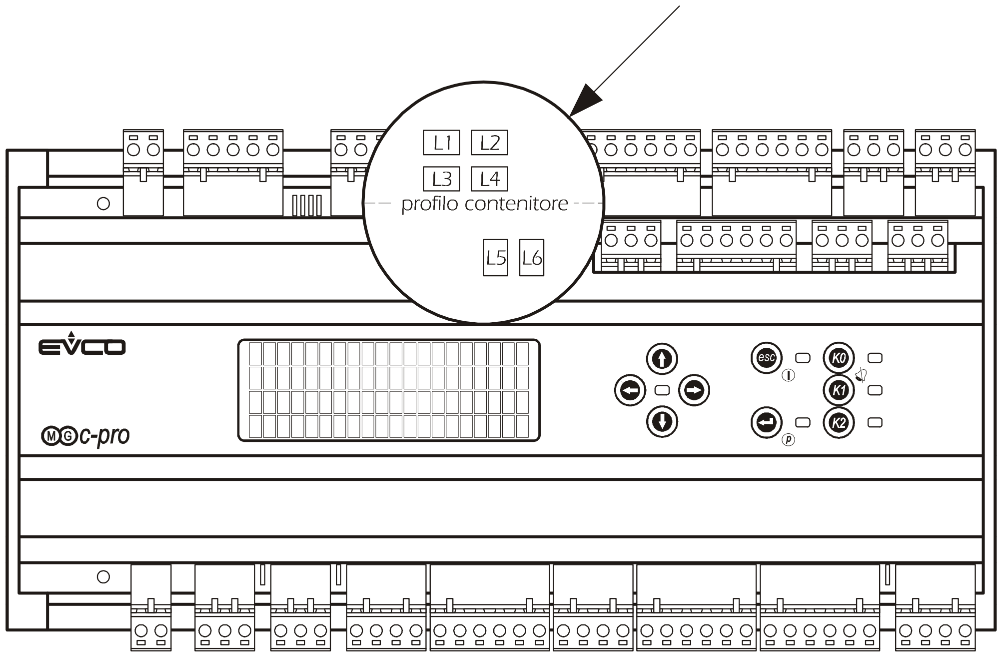
JMP4	Local CAN Baud Rate selection	
A B	Jumper A inserted Jumper B inserted	Baud rate = 20K
A B	Jumper A inserted Jumper B not inserted	Baud rate = 50K
A B	Jumper A not inserted Jumper B inserted	Baud rate = 125K
A B	Jumper A not inserted Jumper B not inserted	Baud rate = 500K

JMP5	RS-485 termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

JMP6	Selection of Analogic Outputs	
A B C D	Jumper A inserted Jumper B inserted Jumper C inserted Jumper D inserted	AO1 Output as current AO2 Output as current AO3 Output as current AO4 Output as current
A B C D	Jumper A not inserted Jumper B not inserted Jumper C not inserted Jumper D not inserted	AO1 Output as voltage AO2 Output as voltage AO3 Output as voltage AO4 Output as voltage

Besides the jumpers setting, for the analogic output signals supplied configuration, the settlement of the controller parameters is also necessary (see the chapter 8 : output signals supplied configuration)

There are also some **LEDs** with diagnostic meaning (note: the L5, L6 LEDs are located inside the controller case)



LED L1	**Local CAN communication status**
On rapidly blinking	OK
On slowly blinking	Warning
On continuous	Bus Error
Off	Bus OFF

Led L2	**Local CAN communication status**
On rapidly blinking	OK
On slowly blinking	Warning
On continuous	Bus Error
Off	Bus OFF

Led L3	**Real Time Clock status**
On rapidly blinking	-
On slowly blinking	Low_Voltage detected
On continuous	Read_Error
Off	OK

Led L4	**EEPROM memory status**
On rapidly blinking	CRC_Error
On slowly blinking	Write_Error
On continuous	Read_Error
Off	OK

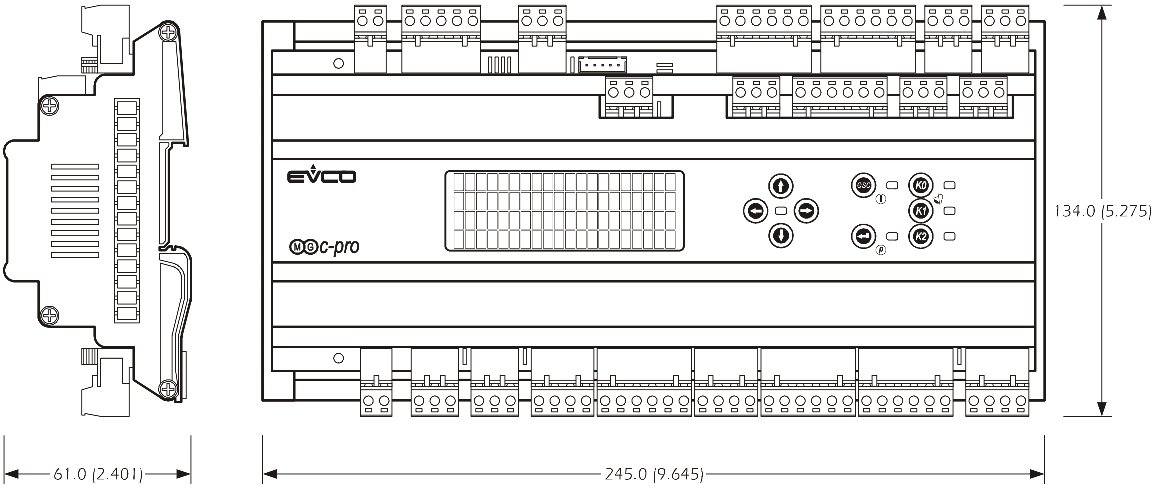
LED L5	**Interrupt**
It indicates the interrupt operating status of the controller: when blinking at 1 Hz, that indicates the internal controller times are properly working	

LED L6	Main operating status
It indicates the operating status of the controller's main program (main): when blinking, it indicates the controller program is properly working. The flashing period indicates the execution time of the main cycle.	

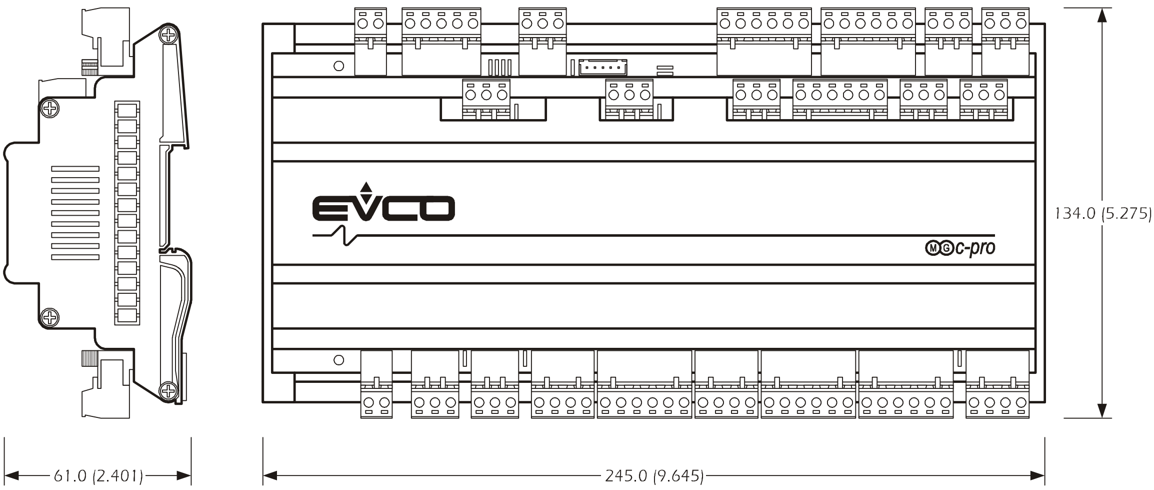
2.3 C-PRO GIGA Dimensions / Installation

The C-PRO GIGA dimensions are reported here below; all dimensions are to be meant in millimeters (inc).

Built-in version



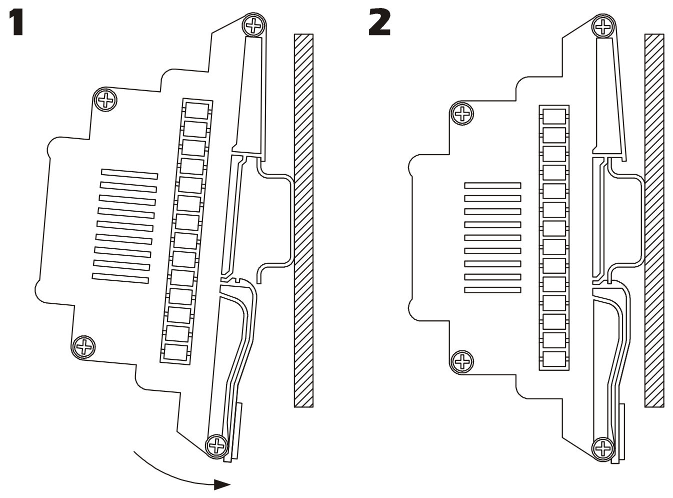
Sealed version



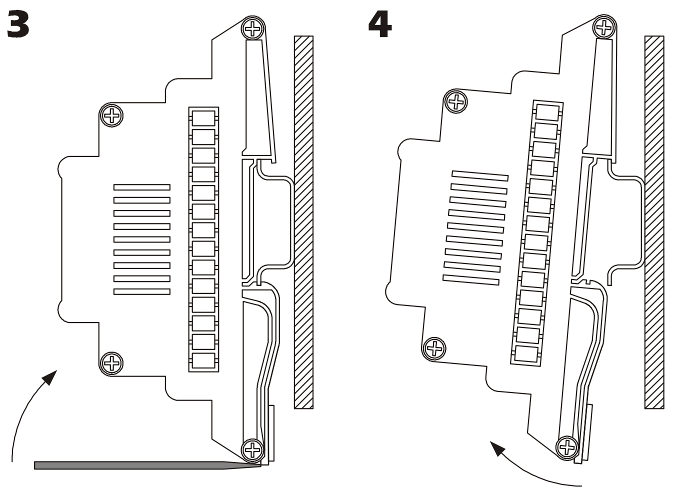
Cautions for the installation:

- ensure that the operating conditions (operating temperature, humidity, etc.) are within the limits indicated in the technical data sheets
- do not install the device close to any heat source (heating elements, hot air ducts, etc.), equipment containing powerful magnets (large diffusers, etc.), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibration or shock
- in compliance with safety regulations, the device must be correctly installed and protected against any contact with any electrical part; all devices must be safely fixed in order to be removed only by means of proper tools.

To install the C-PRO GIGA, proceed as indicated in figures 1 and 2 .



To remove the C-PRO GIGA, use a screw driver and proceed as indicated in figures 3 and 4.



3 C-PRO GIGA technical features

3.1 General features

Safety standards references	**EN 60730-1**
Purpose of the device	Programmable controller for refrigeration, ventilation and air conditioning applications
Electronic control device	To be integrated in equipment
Connections	Plug-in terminal block 5mm pitch for conductors up to 2.5 mm^2
Storage temperature limits	-20T70 °C (@RH<90% non-condensing)
Ambient temperature limits	-10T60 °C 0T50 °C for version with integrated LCD (@RH<90% non-condensing)
Electrical shock protection classification	An integrated control device puts the classification on according to the equipment it is integrated with.
Type of disconnection	Low interruption (relay contacts)
PTI of used insulation materials	>250
Installation	35-mm DIN Guide according to EN 50022
Type of actions	1C
Pollution conditions	Normal
Software class	A

3.2 Housing

Installation	35-mm DIN Guide according to EN 50022
Housing	according to DIN 43880
Material	PVC UL 94 V0 Grey color
Resistance to fire rating	D
Number of DIN modules	14
Protection level	IP 20
Protection level (front only)	IP 40

3.2 General features

		C-PRO GIGA sealed (1)	**C-PRO GIGA sealed (2)**	**C-PRO GIGA built-in**
CPU	Microprocessor	16 bit	16 bit	16 bit
	Oscillator frequency	16 MHz	16 MHz	16 MHz
	Flash program memory	128K	256K	256K
	RAM data storage memory	6K	8K	8K
	A/D converter	8 channels 10bit	8 channels 10bit	8 channels 10bit
WideCAN communication bus (*optional*)	**Number**	**1**	**0**	**0**
	type	CAN V2.0B Optoisolated		
	Physical layer	2 wires + common wire (ISO 11898)		
	Baud rate (max. length = 1000 m)	20K		
	Baud rate (max. length = 400 m)	50K		
	Baud rate (max. length = 250 m)	125K		
	Baud rate (max. length = 50 m)	500K		
	Connector	Disconnectable screw terminals		
	Note: baud rate can be selected by parameter *Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω.*			
RS485 serial communication (UART2) (*optional, alternative to RS232*)	**Number**	**1**	**1**	**0**
	type	RS485, optoinsulated	RS485, optoinsulated	
	Physical layer	2 wires + common	2 wires + common	
	Baud rate (max. length 1000 m)	1200 - 19200	1200 - 19200	
	Connector	Disconnectable screw terminals	Disconnectable screw terminals	
	Note: baud rate can be selected by parameter *Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω.*			
RS232 serial communication (UART2) (*optional,alternative to RS232*)	**Number**	**1**	**1**	**0**
	type	RS232 optoinsulated	RS232 optoinsulated	
	Physical layer	Tx,Rx + 2 signal for modem control + common	Tx,Rx + 2 signal for modem control + common	
	Baud rate (max. length 1000 m)	1200 - 19200	1200 - 19200	
	Connector	Sub-D 9 pin male	Sub-D 9 pin male	

128 KB instead of 256 KB program memory built-in with WideCAN serial output version of the controller is available on request.

3.3 Electrical features

Internal Switching Power supply	Main Input Note: in this case the I/O and the serial port of the controller are not insulated	*24Vac +/- 15%,* *20-60Vdc, max 1A*
External Power supply (double inputs)	Main Input	*13Vdc, 0.6A (both inputs)* *+0.2A if a user interface has to be fed* *+0.6A if an expansion board has to be fed*
	Secondary input Note: in this case the I/O and the serial port of the controller are insulated	15Vdc, 0.15A
EEPROM	Parameter and event log memory	4 Kbyte
Analogic Inputs NTC or Current inputs are configurable through UNI -PRO	**Number**	**6**
	NTC measurement range (10K ohm ±1% @ 25°C)	-40°C - 100°C
	NTC measurement accuracy:	±0.8°C
	NTC measurement resolution	0.1°C
	Current measurement range	0 - 20 mA
	Current measurement accuracy	±0.08 mA
	Current measurement resolution	0.01 mA
	Input resistance	200 Ohm
	Note: by feeding active probes, 12.5Vdc terminals are available (@I maximum sum total <= 200mA)	
Analogic Inputs NTC, PTC, Voltage or Current inputs are configurable through UNI-PRO	**Number**	**2**
	NTC measurement range	-40°C - 100°C
	NTC measurement accuracy:	±0.8°C
	NTC measurement resolution	0.1°C
	PTC measurement range	-50°C - 150°C
	PTC measurement accuracy	±1°C
	PTC measurement resolution	0.1°C
	Current measurement range	0 - 20 mA
	Current measurement accuracy	±0.08 mA
	Current measurement resolution	0.01 mA
	Input resistance	200 Ohm
	Voltage measurement range	0 - 10 V / 0 - 5 V
	Voltage measurement accuracy	±20 mV
	Voltage measurement resolution	0.001 V
	Note : *1) Before applying 10V to the input, please check that the Jumper has been removed;* *2) The Jumper must be removed only for the 0 - 10 V input* *3) To feed active probes, 12.5Vdc terminals are available (@I maximum sum total <= 200mA)*	
Low voltage Digital Inputs	**Number**	**10**
	type	**optoinsulated**
	Voltage range	12 - 24 Vac/dc
	Detection time from OFF to ON	100 ms

	Detection time from ON to OFF	100 ms
	Note: The commons (COM) terminals are connected together	
High voltage Digital Inputs	**Number**	**2**
	type	**optoinsulated**
	Voltage range	100 - 240 Vac
	Detection time from OFF to ON	100 ms
	Detection time from ON to OFF	100 ms

Analog outputs	**Number**	**4**
	type	voltage or current (selectable by dip-switch), optoinsulated
	Jumper inserted	Current
	Current range	0 - 20 mA
	Current output accuracy	±1 mA
	Current output resolution	0.05 mA
	Maximum load of current output	50 - 250Ω
	Current output setting time	1 sec
	Jumper not inserted	Voltage
	Voltage range	0,5 - 10 V
	Voltage output accuracy	±200 mV (without load)
	Voltage output resolution	10 mV
	Maximum load of voltage output	200Ω
	Voltage output settling time	1 sec
	Note: *1) not protected output against permanent short circuit* *2) ((Zl/(Zo+Zl) use load with impedance Zl>1KΩ*	
Digital outputs	**Number**	**13**
	type	electromechanical relays
	With NO contacts	**9**
	With SPDT contacts	**4**
	Contact ratings : relays 1 to xx	2000VA 250Vac, 8A cosθ=1
	Contact ratings :	2000VA 250Vac, 8A cosφ=1 6(4) accordino to EN60730-1
	Contact life cycles	> 100000
	Note: *1)The commons (COM) terminals are not connected together* *2) Main insulation is guaranteed between the relays* *3) Two relays are 5A*	
Internal CAN communication bus	**Number**	**1**
	type	CAN V2.0B no optoinsulated
	Physical layer	2 wires + common wire (ISO 11898)
	Baud rate (max. length = 10 m)	20K

	Baud rate (max. length = 5 m)	50K
	Baud rate (max. length = 2 m)	125K
	Baud rate (max. length = 1 m)	500K
	Connector	Disconnectable screw terminals
	Note: *1) baud rate selectable by two jumpers* *2) The CAN connection consists of a cable with twisted pair (both shielded and not shielded). The first and the last elements of the system must have the bus terminating resistor connected (impedance is 120Ω). A second twisted pair is used for the feed and the ground*	

RS485 serial communication (UART1)	**Number**	**1**
	type	RS485, optoinsulated
	Physical layer	2 wires + common wire
	Baud rate (max. length 1000 m)	1200 - 19200
	Connector	Disconnectable screw terminals
	type	RS232, optoinsulated
	Physical layer	Tx, Rx + 2 signals for modem control + common wire
	Baud rate (max. length 3 m)	1200 - 19200
	Connector	Disconnectable screw terminals
	Note: *1) baud rate is selectable by parameters* *2) The CAN connection consists of a cable with twisted pair (both shielded and not shielded). The first and the last elements of the system must have the bus terminating resistor connected (impedance is 120Ω). A second twisted pair is used for the feed and the ground*	
RTC (Real Time Clock)	**Number**	**1**
	Backup type	Supercup
	RTC data retention time in the event of a power failure	3 days
Buzzer	Number	**1**
Signaling LEDs	Number	6

3.4 C-PRO GIGA built-in user interface

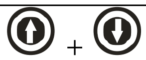
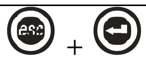
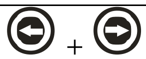
The C-PRO GIGA built-in version has a 4x20 alphanumerical backlit LCD display and a keyboard with 9 buttons and 6 LEDs. Some buttons and LEDs are predefined; this means that their function has been set by the firmware. Other buttons and LEDs are programmable; that means they may be freely used within the UNI-PRO development system.



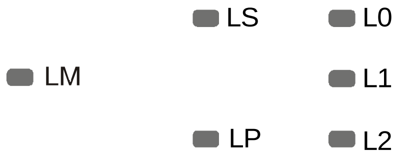
C-PRO GIGA
Built-in Version

The following table shows the functions of the keyboard:

Buttons	MAIN FUNCTION	SECONDARY FUNCTION
	Predefined UP	
	Predefined DOWN	
	Predefined LEFT	
	Predefined RIGHT	
	Predefined ESC	Stand-By command
	Predefined ENTER	1st level programming command
	Programmable	Alarm-off/Detection of alarms
	Programmable	

	Programmable	
		Controller parameter configuration command
		2nd level programming command
		3rd level programming command

The following table shows the LEDs' functions:

	LED	FUNCTION
	LM	Predefined (blinking during controller parameters' configuration)
	LS	Programmable
	LP	Programmable
	L0	Programmable
	L1	Programmable
	L2	Programmable

4 C-PRO EXP GIGA I/O expansion

The C-PRO EXP GIGA I/O expansion allows to expand the I/O of the controller.
The expansion has the following inputs and outputs:

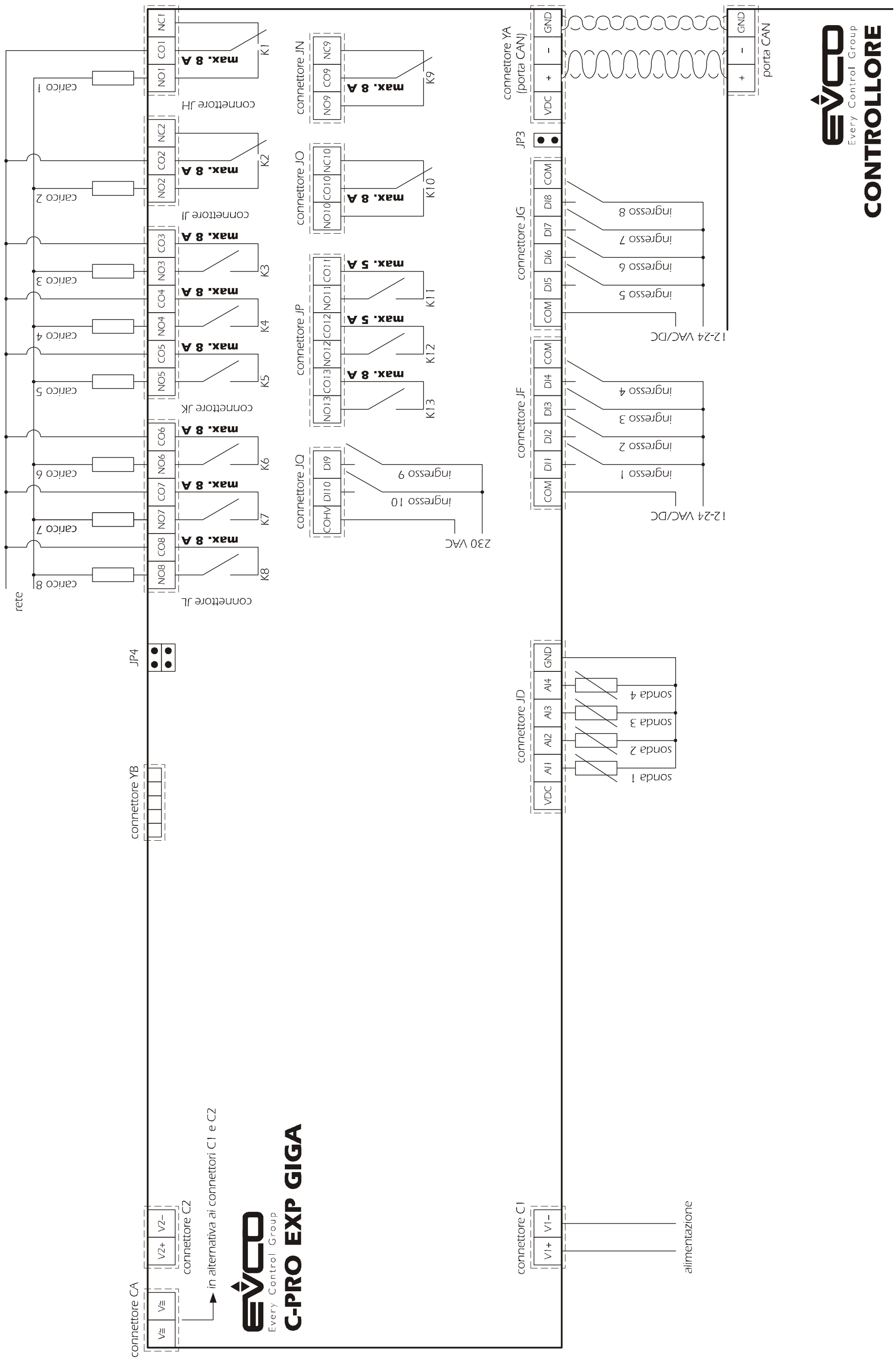
- 4 analogic inputs for NTC / 0-20 mA /4-20 mA , probes
- 10 digital inputs :
  - 8 low voltage (12-24 VAC/DC)
  - 2 high voltage (230 VAC)
- 13 digital outputs (relays) :
  - 11 with 8 A res. @ 250 VAC (4 N.O./N.C. + 7 N.O.)
  - 2 with 5 A res. @ 250 VAC (2 N.O.).



C-PRO EXP GIGA

4.1 C-PRO EXP GIGA wiring layout

The length of the connecting cables reported on chapter 3 is valid also for the I/O expansion.
The C-PRO EXP GIGA wiring layout is here below reported showing the tables of the meaning of inputs and outputs .



C-PRO EXP GIGA wiring layout

The controller and C-PRO EXP GIGA power supplies have to be electrically insulated one from the other.

Lower board 12 VDC + 12 VDC power supply version

Conn.	Letter code	Description
C1-1	VCC	main card power supply (+13Vdc)
C1-2	GND	Main power supply reference
JD-1	VDC	power supply for active sensors (*1)
JD-2	AI 5	analogic input 5, configurable (NTC, 0..20 mA, 4..20 mA)
JD-3	AI 6	Analogic input 6, configurable (NTC, 0..20 mA, 4..20 mA)
JD-4	AI 7	Analogic input 7, configurable (NTC, 0..20 mA, 4..20 mA)
JD-5	AI 8	Analogic input 8, configurable (NTC, 0..20 mA, 4..20 mA)
JD-6	GND	common terminal for analogic inputs
JF-1	COM	common terminal for digital inputs
JF-2	DI 3	digital input no. 3 Vac/Vdc
JF-3	DI 4	digital input no. 4 Vac/Vdc
JF-4	DI 5	digital input no. 5 Vac/Vdc
JF-5	DI 6	digital input no. 6 Vac/Vdc
JF-6	COM	common terminal for digital inputs
JG-1	COM	common terminal for digital inputs
JG-2	DI 7	digital input no. 7 Vac/Vdc
JG-3	DI 8	digital input no. 8 Vac/Vdc
JG-4	DI 9	digital input no. 9 Vac/Vdc
JG-5	DI 10	digital input no. 10 Vac/Vdc
JG-6	COM	common terminal for digital inputs
YA-1	VDC	connector to power a remote terminal at 12 Vdc
YA-2	CAN1+	CAN **+** Local CAN port terminal
YA-3	CAN1-	CAN **-** Local CAN port terminal
YA-4	GND	GND Local CAN port terminal
JH-1	NC 1	normally closed contact relay no. 1
JH-2	COM 1	common relay no. 1
JH-3	NO 1	normally open contact relay no. 1
JI-1	NC 2	normally closed contact relay no. 2
JI-2	COM 2	common relay no. 2
JI-3	NO 2	normally open contact relay no. 2
JK-1	COM 3	common for relay no. 3
JK-2	NO 3	normally open contact relay no. 3
JK-3	COM 4	common relay no. 4
JK-4	NO 4	normally open contact relay no. 4
JK-5	COM 5	common relay no. 5
JK-6	NO 5	normally open contact relay no. 5
JL-1	COM 6	common relay no. 6
JL-2	NO 6	normally open contact relay no. 6
JL-3	COM 7	common relay no. 7
JL-4	NO 7	normally open contact relay no. 7
JL-5	COM 8	common relay no. 8
JL-6	NO 8	normally open contact relay no. 8
YB	PRG	JST connector for programming purposes
C2-1	VCC	Not utilized
C2-2	GND	Not utilized

*1: VDC=12,5V Imax=200mA (as current sum of all VDC terminals)

Lower board 24 VAC/DC power supply version with built-in switching feeder

Conn.	Letter code	Description
CA-1	VCC	main card power supply (24Vac/dc)
CA-2	VCC	main card power supply (24Vac/dc)

Top board

Conn.	Letter code	Description
JN-1	NC 9	normally closed contact relay no. 9
JN-2	COM 9	common relay no. 9
JN-3	NO 9	normally open contact relay no. 9
JO-1	NC 10	normally closed contact relay no. 10
JO-2	COM 10	common relay no. 10
JO-3	NO 10	normally open contact relay no. 10
JP-1	COM 11	common relay no. 11
JP-2	NO 11	normally open contact relay no. 11
JP-3	COM 12	common relay no. 12
JP-4	NO 12	normally open contact relay no. 12
JP-5	COM 13	common relay no. 13
JP-6	NO 13	normally open contact relay no. 13
JQ-1	DI 11	digital input no. 11 230 Vac
JQ-2	DI 12	digital input no. 12 230 Vac
JQ-3	COMHV	common terminal for 230Vac digital inputs

Jumper and LED meaning

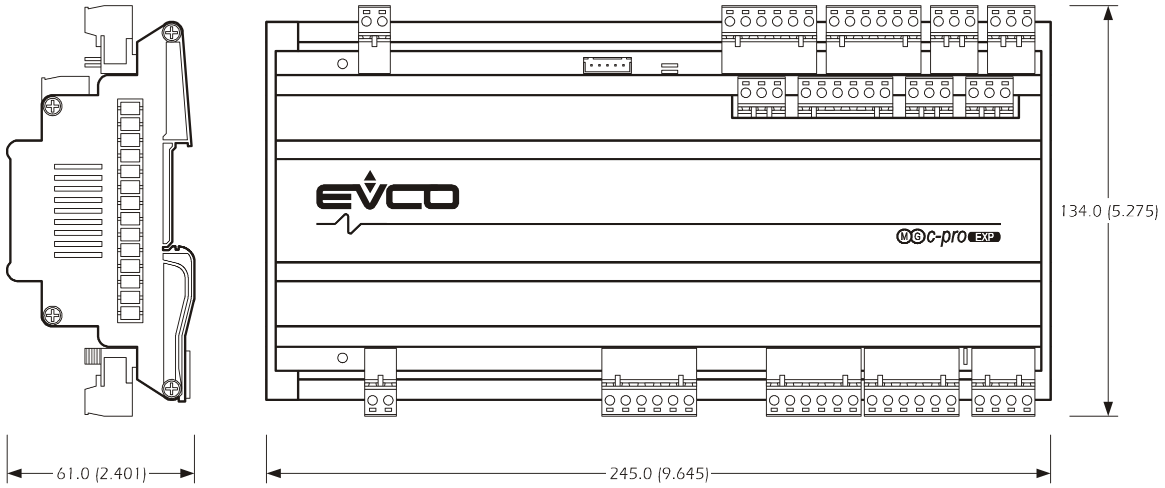
In the controller some configuration jumpers are mounted:

JMP3	CAN termination	
	Jumper not inserted	(120Ω) termination not inserted
	Jumper inserted	(120Ω) termination inserted

JMP4	Internal serial CAN Baud Rate selection	
A B	Jumper A inserted Jumper B inserted	Baud rate = 20K
A B	Jumper A inserted Jumper B not inserted	Baud rate = 50K
A B	Jumper A not inserted Jumper B inserted	Baud rate = 125K
A B	Jumper A not inserted Jumper B not inserted	Baud rate = 500K

4.2 C-PRO EXP GIGA Dimensions / Installation

The C-PRO EXP GIGA dimensions are reported here below; all dimensions are to be meant in millimeters.
.



5 Remote User interface

The user interfaces allow to install a remote display and keyboard far from the controller.
"V-VIEW" user interface (with a alphanumeric 4 x 20 characters LCD display) can be connected to one of the CAN port of the C-PRO GIGA controller. On request a graphic 240 x 128 pixel LCD display (V-GRAPH) user interface is also available.

5.1 V-VIEW

The visualized text on the LCD display, the LEDs and key functions of the user interface are realized with UNI-PRO software development system and use a "browser" technology to load the C-PRO GIGA pages and to refresh the visualized variable value. The user interface is directly interfaced with the controller without downloading any software.
The typical implemental functionality is :

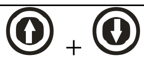
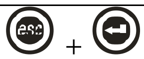
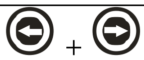
- intuitive navigation with " browser style"
- text and icon combination
- tables utilization with "scroll" possibilities.

5.1.1 V-VIEW User Interface

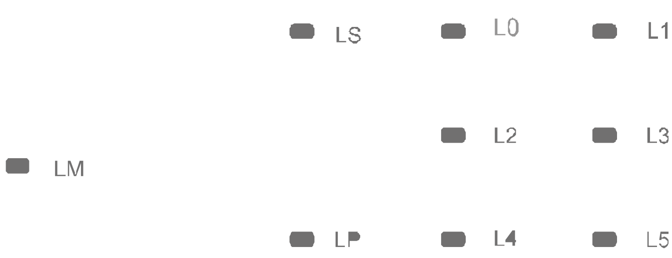


V-VIEW

The following table summarizes the keyboard button meaning:

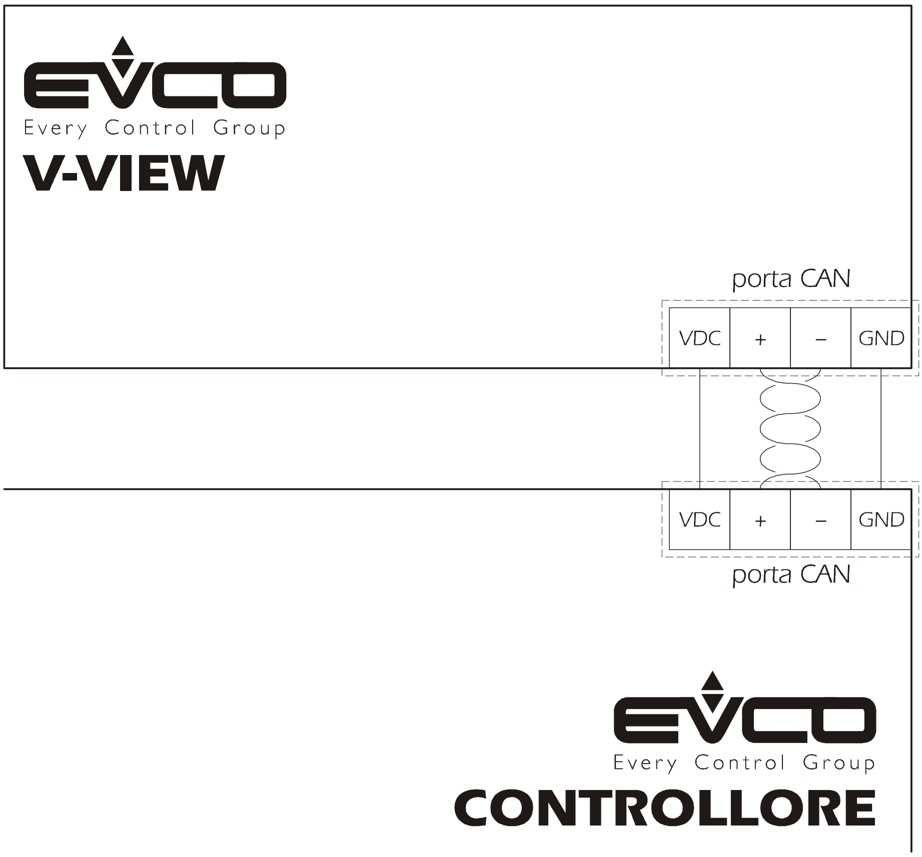
BUTTONS	MAIN FUNCTION	SECONDARY FUNCTION
	Predefined as UP	Programmable
	Predefined as DOWN	Programmable
	Predefined as LEFT	Programmable
	Predefined as RIGHT	Programmable
	Predefined as ESC	Stand-By command
	Predefined as ENTER	1° programming level command
	Programmable	Alarm reset/identification
	Programmable	
	Programmable	
	Programmable	
	Programmable	
	Programmable	
		Controller configuration parameters command
		2° programming level command
		3° programming level command

The following table summarizes the meaning of the LEDs on front panel :



LED	FUNCTION
LM	Predefined (blinking during the parameters configuration of the controller)
LS	Programmable
LP	Programmable
L0	Programmable
L1	Programmable
L2	Programmable
L3	Programmable
L4	Programmable
L5	Programmable

5.1.2 V-VIEW electrical wiring



5.1.3 V-VIEW specifications

General specifications

Safety standards references	**EN 60730-1**
Purpose of the device	To be integrated in equipment
Electronic control device Connections	Plug-in terminal block 5mm pitch for conductors up to 2.5 mm^2
Storage temperature limits	-20T70 °C (@RH<90% non-condensing)
Ambient temperature limits	-10T60 °C 0T50 °C for version with integrated LCD (@RH<90% non-condensing)
Electrical shock protection classification	An integrated control device takes up the classification of the equipment which it is integrated with
PTI of insulation materials used	>250

Housing

Installation	Pannel mounting
Housing	160 x 160 mm

Electrical specifications

Power supply	Main (input)	12Vdc, 0.2A
CPU	Microprocessor	16 bit
	Oscillator frequency	16 MHz
EEPROM	Parameters' memory	256 byte

Serial CAN Communication	**Number**	**1**
	Type	CAN V2.0B not opto-insulated
	Physical Layer	2 wires + common, ISO 11898 standard
	Baud rate (L max. = 10 m)	20K
	Baud rate (L max. = 5 m)	50K
	Baud rate (L max. = 2 m)	125K
	Baud rate (L max. = 1 m)	500K
	Connector	Sconnectable terminals
	Note: baud rate can be selected by parameter *Note: The physical level of the CAN consists of a cable with twisted pair (both shielded and not shielded). The terminator's impedance is 120Ω. A second cable with twisted pair is used for feeding and common (ground)*	
Buzzer	Number	**1**
LCD Display	backlight 4 x 20 alphanumeric	1
Keyboard	Buttons	12
	Led	9

6 Accessories

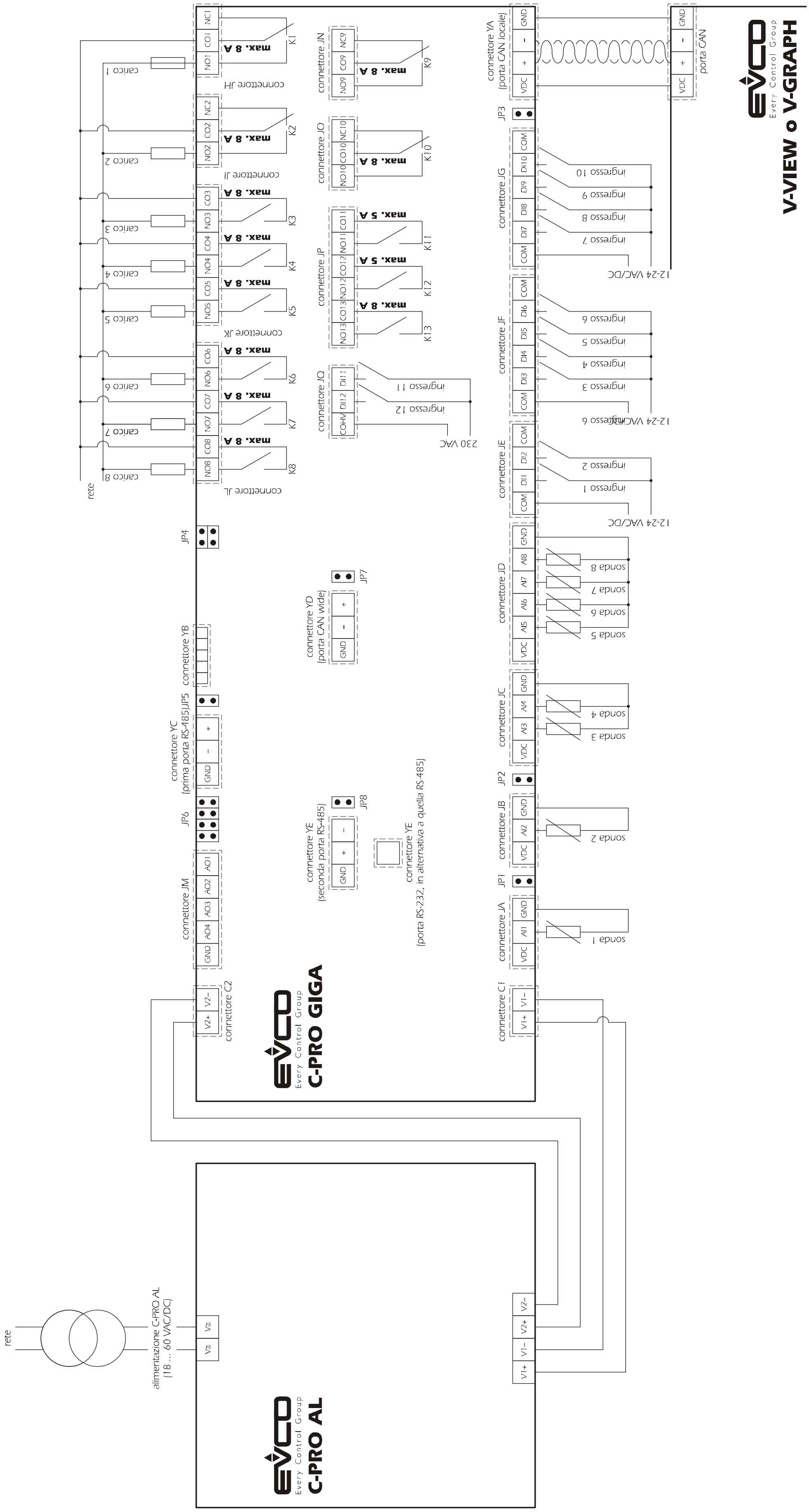
6.1 C-PRO AL switching feeder

C-PRO AL is a two output switching feeder able to provide the power supply to C-PRO GIGA programmable controllers . The range of the C-PRO AL input voltage can be between 18 and 60 Vac/dc , while the output voltage of the feeder's output is 13 Vdc (1,5 A) and 15 Vdc (0,15 A). C-PRO AL is available in 6 DIN modules housing dimensions for DIN rail mounting installation.



C-PRO AL

6.1.1 C-PRO AL electrical wiring



In the previous page, example of connection of C-PRO AL with C-PRO GIGA.
With the same secondary of the transformer, it is possible to feed both C-PRO AL and the C-PRO GIGA low voltage digital input (they work with 12-24 VAC/DC).
It is preferable :

- To connect the possible remote terminal user interface to Local CAN (not opto-insulated) port (providing the user interface with the necessary 12 Vdc power supply)
- To connect the possible expansion to the Wide CAN (opto-insulated) port.

The controller and C-PRO EXP GIGA power supplies have to be electrically insulated one from the other.

7 Configuration of the supplied analogic outputs signal

C-PRO GIGA has four analogic outputs.
Each analogic output can be configured to supply one of the following signal :

- 0,5-10 V (called voltage)
- 0-20 mA (called current)
- 4-20 mA (called current).

To configurate the signal supplied by the analogic output it is necessary :

- positioning the appropriate JMP6 jumper in the selected position (see chapter 2.2 “C-PRO GIGA wiring layout on page 17, jumper and LED meaning ; the configuration jumper is JMP6)
- confirming the choice selected with the “controller’s parameters” relative to the analogic outputs as shown on the following paragraph .

7.1 Parameters configuration relative to the analog output

By logging on the controller parameters’ configuration procedure relative to the analogic outputs act in the following way :

Both for the remote or built-in user interface :

1. Ensure that the controller and the user interface are both switched on and no utilization is connected to the analogic outputs .
2. Keep both and buttons pressed together for two seconds : first available voice will be visualized.
3. Press and release button to select “Parameters”.
4. Press and release button : “Input Password” will be visualized.
5. Press and release button: the cursor blinks.
6. Press and release button to set “ -19”.
7. Press and release button :first available voice will be visualized.
8. Press and release button :further available voice will be visualized.
9. Press and release button to select one of the voice “Type AO1 … AO4”.
10. Press and release button : the cursor blinks.

11. Press and release or button to select the wanted value (0-20 mA or 4-20 mA or 0-10 V).
12. Press and release button to confirm the selected choice.
13. Repeat the selection for each analogic output "Type AO1 … AO4".
14. Switch – off the controller

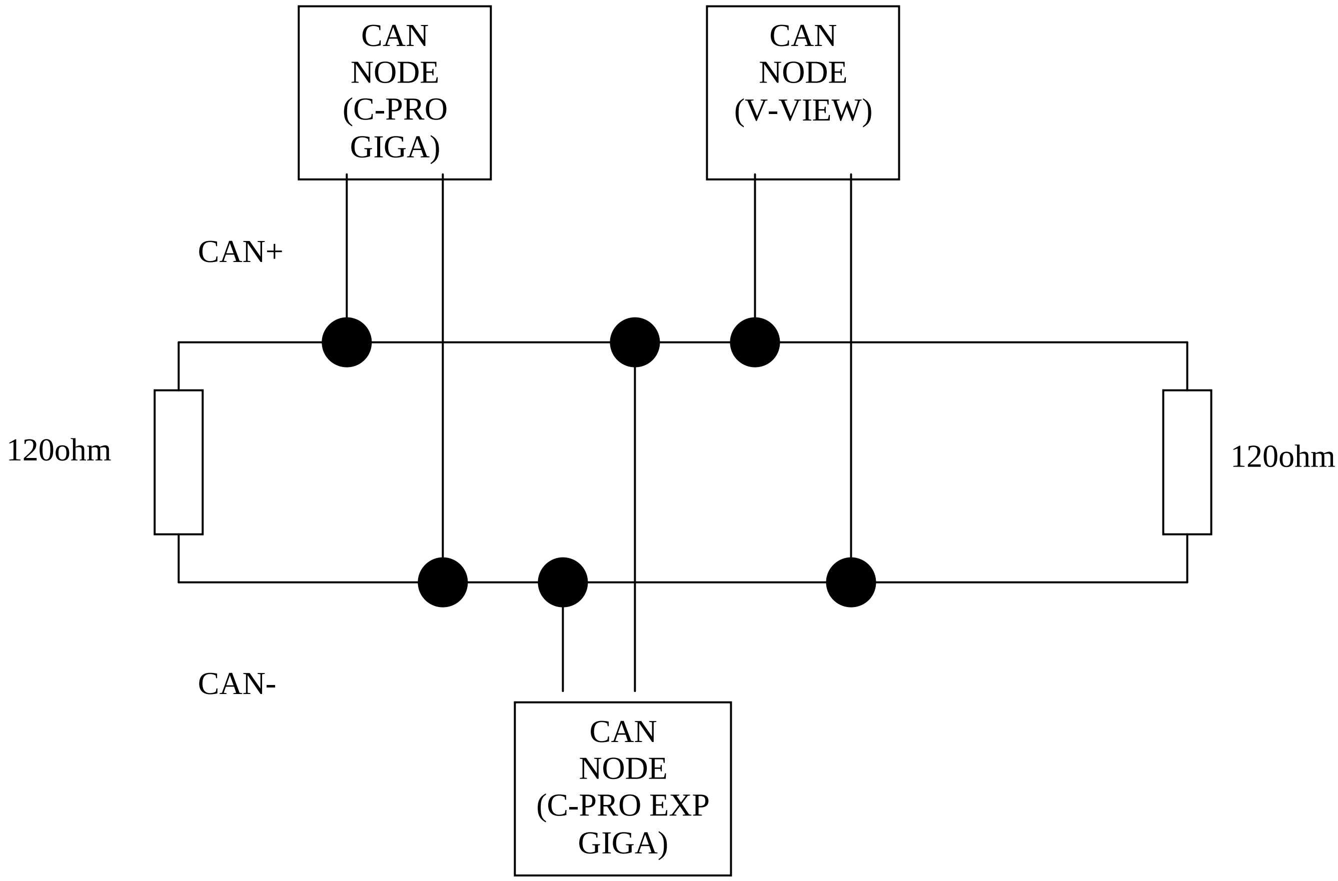
For a quick closing procedure :

8 Closing the analogic output configuration procedure

1. Press and release repeatedly button.

7 CAN Connection

C-PRO GIGA can be connected to other controllers, to expansion modules and to one or more user interfaces using either local or wide CAN serial port. The CAN bus uses the ISO 11898 standard, a balanced two-wire communication very similar to the RS-485 standard.
Resistors with a recommended rating of 120-124 ohm have to be fitted at each end of the bus.



If connection is established through the local CAN bus, it is possible to power a user interface terminal by using the 4-terminal connector, according to the following table:

C-PRO GIGA	V-VIEW User Interface
YA 1 (VDC)	**PA 1 (VDC)**
YA 2 (CAN+)	PA 2 (CAN+)
YA 3 (CAN-)	PA 3 (CAN-)
YA 4 (GND)	PA 4 (GND)

The maximum number of expansions and user terminals is 32.

The maximum number of controllers for the user terminal V-VIEW is 2.

8.1 Notes on the parameter of the controller relative to the CAN net configuration

<u>To log on the controller parameters configuration procedure relative to the analogic output act in the following way :</u>

Both for the remote or built-in user interface :

1. Ensure that the controller and the user interface are both switched on no utilization isbe connected with the analogic output
2. Keep pressed at the same time (UP) and (DOWN) buttons for two seconds : the first available voice will be visualized (the voices are relative to the controller; for the voices relative to the user interface repeat the selection from “reset”).

<u>To select the controller parameters relative to the CAN network configuration:</u>

1. Press and release (DOWN) button to select “Network” voice.
2. Press and release (ENTER) button: if the controller is visualizing the net parameters, the voice “Input Password” will be visualized: in this case see the following 3. and 4. (in opposite case see directly point 5.).
3. Press and release (ENTER) button: the cursor blinking.
4. Press and release (DOWN) button to set “ -19”.
5. Press and release (ENTER) button: the first voice available will be visualized; if it is visualizing the net parameters relative to the controller, the question asked will be which communication port has to be referred (Local CAN, Wide CAN, UART1 o UART2).

<u>To select a parameter:</u>

1. Press and release (DOWN) button

<u>To modify a parameter:</u>

1. Press and release (ENTER) button: the cursor blinking.
2. Press and release (UP) or (DOWN) buttons to select the value
3. Press and release (ENTER) button to confirm the selection done.

4. Switch – off the controller.

For a quick closing procedure :

1. Press and release repeatedly (ESC) button

The main parameters of the CAN net are the following :

- "My Node" (represents the data sender ID).
- "Network Node" (represents the receiver ID)
- Baud rate (represent the data transmissions speed; initially it can be useful to let this value set at "Auto"; in this way the device will try to connect at different speed);
  Local CAN port baud rate can be set with "JMP4" jumper.

Predefined value :

- the parameter My Node for a controller is set at 1
- the parameter My Node for an expansion is set at 2
- the parameter My Node for a user interface is set at 99.

Every device in the network represents a knot (the maximum knot numbers are 32); each knot has an ID (the Id range is from 1 to 127).

Every device in the network has to be set as regards the network components through "Network Node" parameters.

Example:
If a controller, an expansion and a user interface are installed, set the following value on the controller in the following way :

1. Assign at "Network Node 1" the address "2" (expansion).
2. Assign at "Network Node 2" the address "99" (user interface).

Repeat the same operations for the expansion and the user interface.

<u>**ATTENTION:**</u> the parameters as regards the net could be writing the application software.

Hardware Manual C-PRO GIGA.

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